Achieving Operator Synergism with Virtual Image Displays

Michael Wingfield

781-271-7898 • mwing@mitre.org

MSR

MITRE Technology Program

Problem

- How do we interface with data on virtual image displays?
- Goal: "Intelligent" data portability for wearable computers

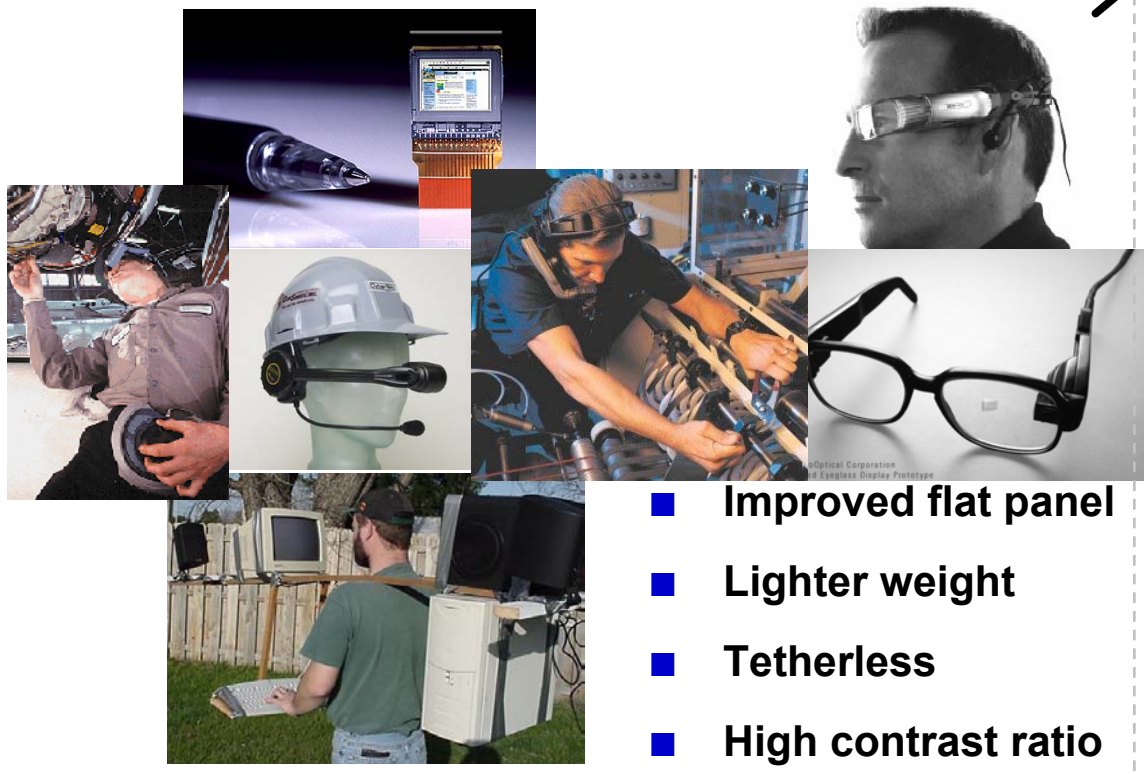
MITRE

Background

Evolution of Virtual Image Displays

1990 — 2000 — Future

- CRT
- Heavy
- High voltage
- Monochrome



- Improved flat panel
- Lighter weight
- Tetherless
- High contrast ratio

MITRE

Objective

- Evaluate the use of augmented reality as an interface for wearable computing
- Determine the relationship between display features (e.g., registration accuracy, reliability) and the attention and trust allocated to that information

MITRE

Activities

- Head-up vs. head-down display comparison for navigation
- Laboratory study examining the relationship between display features
- West Point collaboration

MITRE

Highlight

United States Military Academy

9 cadets participated in a laboratory experiment. Metrics included eye tracking.

- **Conducted laboratory experiment examining the relationship between registration accuracy and reliability in the use of augmented reality cueing**
- **<u>Cadet Thesis</u>: Head-Up Display versus Written Instructions for Packing a Parachute**

  Jennifer Jo and Jennifer Smith
  - Use of wearable displays was not significantly different from written instructions
  - Limitations in flexibility and range of the Xybernaut
    - e.g., location and stability of the eyepiece

MITRE

Highlight/Demonstration

Head-up vs. Head-down Comparison for Navigation

From OM-309:

Turn left.
Turn right at the end of the hallway.
Turn right at the hallway.
Go straight through the door.
Turn right at the end of the hallway.
Go straight through the door.

Findings:

- Social acceptance of technology
- Complaints of eye-strain
  - differing focal distances between the two eyes
  - differing levels of illumination to each eye
- Presentation of imagery to dominant vs. non-dominant eye

MITRE

Impacts

- **Academic/R&D Community**
  - Invited speaker at WBR Soldier Technology 2002
  - Collaboration with United States Military Academy, Department of Behavioral Sciences and Leadership
- **Vendor Community**
  - SBIR proposal submitted
- **Work Program**
  - Pursuing applications in Decision Support, Sensor Systems, CAASD, GATM

MITRE

Future Plans